of the Rotterdam population. If Ct screening were adopted in the Netherlands, schools might offer opportunities to increase the participation rate as an alternative testing facility for those who are hard to motivate by postal screening. This deserves further study.

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CONTRIBUTORS

HG and OdZ designed the study and HG was project leader; JR was scientific supervisor of the study; HG, IV, JO, and OdZ have contributed to the study protocol and collection of data; analysis was done by HG and IV; all authors contributed to the interpretation of data and critically reviewed the draft, which was written and finalised by HG.

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REFERENCES

1 **Stamm W**. Chlamydia trachomatis. In: *Sexually transmitted diseases*. New York: McGraw-Hill, 1999.
2 **Bloomfield PJ**, Kent C, Campbell D, *et al*. Community-based chlamydia and gonorrhea screening through the United States mail, San Francisco. *Sex Transm Dis* 2002;**29**:294–7.
3 **Klausner JD**, McFarland W, Bolan G, *et al*. Knock-knock: a population-based survey of risk behavior, health care access, and Chlamydia trachomatis infection among low-income women in the San Francisco Bay area. *J Infect Dis* 2001;**183**:1087–92.
4 **Ku L**, Sonenstein FL, Turner CF, *et al*. The promise of integrated representative surveys about sexually transmitted diseases and behavior. *Sex Transm Dis* 1997;**24**:299–309.
5 **Turner CF**, Rogers SM, Miller HG, *et al*. Untreated gonococcal and chlamydial infection in a probability sample of adults. *JAMA* 2002;**287**:726–33.
6 **Andersen B**, Olesen F, Moller JK, *et al*. Population-based strategies for outreach screening of urogenital Chlamydia trachomatis infections: a randomized, controlled trial. *J Infect Dis* 2002;**185**:252–8.
7 **Fenton KA**, Korovessis C, Johnson AM, *et al*. Sexual behaviour in Britain: reported sexually transmitted infections and prevalent genital Chlamydia trachomatis infection. *Lancet* 2001;**358**:1851–4.
8 **Low N**, McCarthy A, Macleod J, *et al*. The chlamydia screening studies: rationale and design. *Sex Transm Infect* 2004;**80**:342–8.
9 **Van Bergen JEAM**, Gotz HM, Richardus JH, *et al*. Prevalence of urogenital Chlamydia trachomatis increases significantly with level of urbanisation and suggests targeted screening approaches: results from the first national population based study in the Netherlands. *Sex Transm Infect* 2005;**81**:17–23.
10 **Van Valkengoed IG**, Boeke AJ, Morre SA, *et al*. Disappointing performance of literature-derived selective screening criteria for asymptomatic Chlamydia trachomatis infection in an inner-city population. *Sex Transm Dis* 2000;**27**:504–7.
11 **Burstein GR**, Waterfield G, Joffe A, *et al*. Screening for gonorrhea and chlamydia by DNA amplification in adolescents attending middle school health centers. Opportunity for early intervention. *Sex Transm Dis* 1998;**25**:395–402.
12 **Cohen DA**, Nsuami M, Etame RB, *et al*. A school-based Chlamydia control program using DNA amplification technology. *Pediatrics* 1998;**101**:E1.
13 **Poulin C**, Alary M, Bernier F, *et al*. Prevalence of Chlamydia trachomatis and Neisseria gonorrhoeae among at-risk women, young sex workers, and street youth attending community organizations in Quebec City, Canada. *Sex Transm Dis* 2001;**28**:437–43.
14 **Debattista J**, Clementson C, Mason D, *et al*. Screening for Neisseria gonorrhoeae and Chlamydia trachomatis at entertainment venues among men who have sex with men. *Sex Transm Dis* 2002;**29**:216–21.
15 **Gunn RA**, Podschun GD, Fitzgerald S, *et al*. Screening high-risk adolescent males for Chlamydia trachomatis infection. Obtaining urine specimens in the field. *Sex Transm Dis* 1998;**25**:49–52.
16 **Jones CA**, Knaup RC, Hayes M, *et al*. Urine screening for gonococcal and chlamydial infections at community-based organizations in a high-morbidity area. *Sex Transm Dis* 2000;**27**:146–51.
17 **Van Leeuwen JM**, Rietmeijer CA, LeRoux T, *et al*. Reaching homeless youths for Chlamydia trachomatis and Neisseria gonorrhoeae screening in Denver, Colorado. *Sex Transm Infect* 2002;**78**:357–9.
18 **Rietmeijer CA**, Yamaguchi KJ, Ortiz CG, *et al*. Feasibility and yield of screening urine for Chlamydia trachomatis by polymerase chain reaction among high-risk male youth in field-based and other nonclinic settings. A new strategy for sexually transmitted disease control. *Sex Transm Dis* 1997;**24**:429–35.
19 **Bauer HM**, Chartier M, Kessell E, *et al*. Chlamydia screening of youth and young adults in non-clinical settings throughout California. *Sex Transm Dis* 2004;**31**:409–14.
20 **Richardson E**, Sellors JW, Mackinnon S, *et al*. Prevalence of Chlamydia trachomatis infections and specimen collection preference among women, using self-collected vaginal swabs in community settings. *Sex Transm Dis* 2003;**30**:880–5.
21 **Moss NJ**, Gallaread A, Siller J, *et al*. ''Street medicine'': collaborating with a faith-based organization to screen at-risk youths for sexually transmitted diseases. *Am J Public Health* 2004;**94**:1081–4.
22 **Gotz HM**, van Bergen JE, Veldhuijzen IK, *et al*. A prediction rule for selective screening of Chlamydia trachomatis infection. *Sex Transm Infect* 2005;**81**:24–30.
23 **Palmer S**, Torgerson DJ. Economic notes: definitions of efficiency. *BMJ* 1999;**318**:1136.
24 **Rours GI**, Verkooyen RP, Willemse HF, *et al*. Use of pooled urine samples and automated DNA isolation to achieve improved sensitivity and cost-effectiveness of large-scale testing for Chlamydia trachomatis in pregnant women. *J Clin Microbiol* 2005;**43**:4684–90.
25 **Van Valkengoed IG**, Boeke AJ, van den Brule AJ, *et al*. [Systematic home screening for Chlamydia trachomatis infections of asymptomatic men and women in family practice by means of mail-in urine samples]. *Ned Tijdschr Geneeskd* 1999;**143**:672–6.
26 **Cohen DA**, Nsuami M, Martin DH, *et al*. Repeated school-based screening for sexually transmitted diseases: a feasible strategy for reaching adolescents. *Pediatrics* 1999;**104**:1281–5.
27 **Cohen DA**, Nsuami M, Brooks B, *et al*. School-based screening for sexually-transmitted diseases. *J LA State Med Soc* 1999;**151**:617–21.
28 **Nsuami M**, Cohen DA. Participation in a school-based sexually transmitted disease screening program. *Sex Transm Dis* 2000;**27**:473–9.
29 **Wiesenfeld HC**, Lowry DL, Heine RP, *et al*. Self-collection of vaginal swabs for the detection of Chlamydia, gonorrhea, and trichomoniasis: opportunity to encourage sexually transmitted disease testing among adolescents. *Sex Transm Dis* 2001;**28**:321–5.
30 **Kahn RH**, Moseley KE, Thilges JN, *et al*. Community-based screening and treatment for STDs: results from a mobile clinic initiative. *Sex Transm Dis* 2003;**30**:654–8.
31 **Stephenson J**, Carder C, Copas A, *et al*. Home screening for chlamydial genital infection: is it acceptable to young men and women? *Sex Transm Infect* 2000;**76**:25–7.
32 **Bull SS**, Jones CA, Granberry-Owens D, *et al*. Acceptability and feasibility of urine screening for Chlamydia and gonorrhea in community organizations: perspectives from Denver and St Louis. *Am J Public Health* 2000;**90**:285–6.

COMMENTARY

Technical advances, now permitting use of urine and self collected vaginal specimens, have offered multiple opportunities for screening for chlamydial infection. Screening can be invited and returned by mail using either urine or vaginal swabs[1 2] or be provided via internet contact,[3] with collection kits mailed or picked up at pharmacies or other locales. Specimens can be obtained in a wide variety of settings besides the clinical care environment—including at home,[1 2] at community gatherings,[4 5] in detention facilities,[6] schools,[7] and even from individuals who are accessed in street settings by outreach workers.[8 9] It seems the possibilities are limited only by the imagination of the researcher. However, all too often there has been little ''head to head'' comparison of such approaches, in terms of yield or efficiency.

The study by Götz and colleagues[10] helps address this need, by evaluating operational and efficiency aspects of screening in school, community group, and street settings. Although the study is a pilot and rather small (n = 556), the findings

are consistent with previous evaluations and suggest which approaches can be expected to expand coverage most efficiently.

Consistent with other reports, Götz *et al*[10] found that accessing, testing, and treating young adults via street outreach is quite inefficient from a time and effort perspective.[8] This makes sense, given the effort required to approach and motivate naive people individually; justification for such an approach would seem to require more evidence than is currently available that identifying such infected individuals is of particular public health importance.

However, testing eligible individuals who have already gathered together—whether in a community group or in a school setting—seems far more promising, and Götz *et al*[10] found that time required to access individuals for testing was comparable in these settings. The feasibility of such approaches has been reported previously, but an assessment of the incremental yield for effort when compared with clinic based screening would also be welcome. Such approaches may reach individuals who do not access care regularly, and seem acceptable to minority and low income populations. The prevalence observed among those tested would be expected to vary, depending upon the characteristics of the population accessed.

That such approaches are feasible, and perhaps comparably efficient, unfortunately does not provide sufficient information needed to identify their proper role in a chlamydia prevention programme. Although opportunistic screening of young women for chlamydia has been a primary prevention strategy in some countries, there is evidence that screening coverage has not been adequate.[11 12] There are questions about the extent to which increasing chlamydia rates (or at least their failure to continue to decline) are related to inadequate screening coverage[11] or with the use of more sensitive diagnostic tests[13]; others have suggested that with widespread chlamydia screening, duration of infection is sufficiently shortened so as to reduce population levels of immunity, allowing an increase in incidence and re-infection.[14] If this is true, reductions in the rate of chlamydia may not occur without the availability of vaccines.[14]

Although the technical tools available for detecting and treating chlamydia have never been more plentiful, this abundance is accompanied by uncertainty about exactly how to best use these tools. Hopefully, additional research will help clarify what it takes (the availability of vaccines notwithstanding) to sustain ongoing decreases in chlamydia prevalence and incidence along with improvements in reproductive health. Although mathematical modelling is informative,[15] there is need for evaluation of the relation between prevention activities and chlamydia rates, assessing, for example, community based data about screening coverage among young women, percentage of exposed partners treated appropriately, and identification and treatment of asymptomatic infection among males. Such information may help to define the role for targeting those high risk individuals not accessed by opportunistic screening in clinical settings, using approaches such as those evaluated by Götz *et al*.[10]

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REFERENCES

1 **Andersen B**, Ostergaard L, Sorensen H, *et al*. Diagnosis of urogenital Chlamydia trachomatis infections by home-obtained, mailed samples: do we need a telephone hotline for information and advice? *Scand J Infect Dis* 2002;**34**:262–6.
2 **Sparks R**, Helmers JR, Handsfield HH, *et al*. Rescreening for gonorrhea and chlamydial infection through the mail: a randomized trial. *Sex Transm Dis* 2004;**31**:113–16.
3 **Gaydos A**, Barnes M, Dwyer K, *et al*. Can the internet be used to facilitate screening for Chlamydia trachomatis by reaching non-clinic populations. 16th biennial meeting of the International Society for Sexually Transmitted Diseases Research, Amsterdam, Netherlands, July, 2005.
4 **Bauer HM**, Chartier M, Kessell E, *et al*. Chlamydia screening of youth and young adults in non-clinical settings throughout California. *Sex Transm Dis* 2004;**31**:409–14.
5 **Marrazzo JM**, White CL, Krekeler B, *et al*. Community-based urine screening for Chlamydia trachomatis with a ligase chain reaction assay. *Ann Intern Med* 1997;**127**:796–803.
6 **Kahn RH**, Mosure DJ, Blank S, *et al*. Chlamydia trachomatis and Neisseria gonorrhoeae prevalence and coinfection in adolescents entering selected US juvenile detention centers, 1997–2002. *Sex Transm Dis* 2005;**32**:255–9.
7 **Nsuami M**, Cohen DA. Participation in a school-based sexually transmitted disease screening program. *Sex Transm Dis* 2000;**27**:473–9.
8 **Gunn RA**, Podschun GD, Fitzgerald S, *et al*. Screening high-risk adolescent males for Chlamydia trachomatis infection. Obtaining urine specimens in the field. *Sex Transm Dis* 1998;**25**:49–52.
9 **Rietmeijer CA**, Yamaguchi KJ, Ortiz CG, *et al*. Feasibility and yield of screening urine for Chlamydia trachomatis by polymerase chain reaction among high-risk male youth in field-based and other nonclinic settings. A new strategy for sexually transmitted disease control. *Sex Transm Dis* 1997;**24**:429–35.
10 **Götz HM**, Veldhuijzen IK, Ossewaarde JM, *et al*. *Chlamydia trachomatis* infections in multi-ethnic urban youth: a pilot combining STI health education and outreach testing in Rotterdam, Netherlands. *Sex Transm Infect* 2006;**82**:148–52.
11 **Low N**, Harbord RM, Egger M, *et al*. Screening for chlamydia. *Lancet* 2005;**365**:1539.
12 **Centers for Disease Control and Prevention**. Chlamydia screening among sexually active young female enrollees of health plans—United States, 1999–2001. *MMWR Morb Mortal Wkly Rep* 2004;**53**:983–5.
13 **Fine D**, Mosure DJ, Dicker LW, *et al*. Increasing chlamydia positivity among women attending region X family planning clinics, 1997–2004: Is NAAT testing the reason? 16th biennial meeting of the International Society for Sexually Transmitted Diseases Research, Amsterdam, Netherlands, July, 2005.
14 **Brunham RC**, Pourbohloul B, Mak S, *et al*. The unexpected impact of a Chlamydia trachomatis infection control program on susceptibility to reinfection. *J Infect Dis* 2005;**192**:1836–44.
15 **Kretzschmar M**, Welte R, van den Hoek A, *et al*. Comparative model-based analysis of screening programs for Chlamydia trachomatis infections. *Am J Epidemiol* 2001;**153**:90–101.